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NOAA Great Lakes Environmental Research Laboratory (GLERL)
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PROFESSIONAL INTERESTS

Operational Coastal Ocean Forecast System, Coupled Atmosphere-Ocean-Wave Modeling System, Hydrodynamic Modeling, Satellite Remote Sensing, Sediment Transport Processes, Data Assimilation and Geographic Information Systems (GIS)

EDUCATION

M.B.A., Freeman School of Business, Tulane University, 2014	New Orleans, LA
<ul style="list-style-type: none">• Management and Finance concentration	
Ph.D., Civil and Environmental Engineering, The Ohio State University, 1998	Columbus, OH
<ul style="list-style-type: none">• Major: Coastal Engineering and Numerical Modeling• Minor: Atmospheric Science and Geographic Information System (GIS)	
MSCE, Civil and Environmental Engineering, The Ohio State University, 1989	Columbus, OH
BSCE, Civil Engineering, National Taipei Institute of Technology, 1985	Taipei, Taiwan

AWARDS/HONORS

- Patent, “An automated method and system for predicting high resolution tidal heights and currents in coastal and estuarine zones”, U.S. Patent and Trademark Office, 2014
- Contribution Award, Naval Research Laboratory, Department of the Navy, 2010, 2012, 2013
- Invention Award, Naval Research Laboratory, Department of the Navy, 2011, 2014
- American Meteorological Society (AMS) Special Award, for “developing the first U.S. coastal forecasting system to make routine operational predictions of currents, temperature and key constituents”, 2001(with 12 scientists)
- Licensed Professional Engineer (PE), 1998
- Fellowship, NOAA Colloquium on Environmental Predictions, 1993

PROFESSIONAL EXPERIENCE

Supervisory Physical Scientist and Branch Chief

Integrated Physical and Ecological Modeling and Forecasting Branch,

NOAA Great Lakes Environmental Research Laboratory, Ann Arbor, MI

2015- present

NOAA/NESDIS/CoastWatch Great Lakes Node Manager

2018- present

- Develop, formulate and manage budget, resources, staffing and scientific research projects
- Conduct research on integrated model development, data assimilation and ensemble forecasting
- Oversee Great Lakes Operational Forecasting System (GLOFS) transition to NOS operations
- Oversee NESDIS Great Lakes CoastWatch data, product, service and website operations
- Adjunct faculty and thesis/dissertation advisory committee at Ohio State University, Tulane University, Michigan Technological University, University of Wisconsin, University of Maryland, University of Michigan and Swiss Federal Institute of Technology (EPFL)

Oceanographer, Naval Research Laboratory, Stennis Space Center, MS 2008 - 2015

- Developed and implemented coupled air-ocean-wave forecast models (COAMPS) for U.S. Navy
- Validated water levels, current velocity, temperature and wave fields from model outputs
- Conducted basic and applied research in ocean sciences
- Transitioned ocean models into U.S. Navy operational forecast centers
- Performed numerical model simulation, data analysis and visualization
- Presented research findings in professional conferences, published journal articles, Validation Test Reports (VTR) and technical reports

Adjunct Faculty, Dept. of Civil and Environmental Eng., OSU, Columbus, OH 2007

- Taught Fluid Mechanics, Open Channel Hydraulics and Applied Hydrology

Founder and Principal Scientist, Aqualinks Technologies Inc., Columbus, OH 2003 – 2007

- Managed R&D staff and oversaw day-to-day operations
- Developed and implemented the Next Generation Operational Forecast System for NOAA/NOS
- Authored five NOAA/NOS technical memorandum reports
- Designed VHF-based marine identification communication hardware (AIS) and software
- Provided consulting services for ENR200 engineering firms and wrote SBIR proposals

Senior Research Engineer, Dept. of Civil and Environmental Eng., OSU 1998–2003

- Led team of the Great Lakes Forecasting System (GLFS)
- Supervised post-doctoral scientists and graduate students
- Developed and maintained the Great Lakes Forecasting System website
- Conducted research projects funded by NSF, NOAA, EPA and USGS

Graduate Research Associate, Dept. of Civil and Environmental Eng., OSU 1990–1998

- Assisted in the development of the Great Lakes Forecasting System (GLFS)
- Applied satellite cloud data to improve heat flux and 3-D model's temperature predictions
- Developed Visual Basic GLFSVIEW software application to disseminate GLFS products
- Derived Great Lakes water temperature and turbidity maps from NOAA AVHRR satellite data

Visiting Research Scientist, NOAA GLERL, Ann Arbor, MI 1992

- Setup Great Lakes Forecasting System workstation version for the National Weather Service
- Developed programs to decode meteorological data for numerical weather prediction models
- Applied GIS software to generate Great Lakes ice contour maps from satellite data

MAJOR RESEARCH AND CONSULTING CONTRACTS

- PI, Long-term Data Assimilative, temperature and currents database for Lake Erie and Saginaw Bay, EPA Great Lakes Restoration Initiative (GLRI), 2018-2020
- PI, Improving Lake-Effect Snow and Ice Forecasting for the Great Lakes Regions, NOAA Office of Weather and Air Quality Office, 2017-2019

- Co-Principal Investigator, The Central Role of the Mississippi River and its Delta in the Oceanography, Ecology and Economy of the Gulf of Mexico Large Marine Ecosystem, NOAA-RESTORE ACT. 2015-2017
- Consultant, Data Acquisition and Analysis on Hurricane Isaac wind and precipitation. Steines and Eppling. 2014
- Consultant, Meteorological and oceanographic data analysis in Port Fourchon and Gulf of Mexico. Steines and Eppling. 2014
- Principal Scientist, Development and Implementation of the Next Generation Operational Forecasting (NGOFS). NOAA/NOS. 2004 - 2007
- Principal Scientist, Performance Evaluation and Skill Assessment of the Great Lakes Forecasting System. NOAA/NOS. 2004 - 2005
- Co-Principal Investigator, The Impact of Episodic Events on Nearshore-Offshore Transport in the Great Lakes: Sediment Resuspension and Transport Modeling Program, National Science Foundation (NSF). 1997 - 2002
- Co-Principal Investigator, Examining the Effects of Lake Water Level Variations on Sediment Resuspension, Ohio Sea Grant, 2002 - 2004
- Co-Principal Investigator, Development and evaluation of a coupled model to predict E.Coli concentration at public beaches: a first application at Edgewater Park, Ohio, Lake Erie Protection Fund (LEPF) and United States Geological Survey (USGS), 2001- 2002
- Consultant, Development of a high resolution hydrodynamic and bacteria model for the Cleveland, Ohio region CSO facility planning, Limno-Tech Inc., 2002.
- Consultant, Lake Ontario Hydrodynamic Modeling project to evaluate lake currents during extreme storm events. O'Brien and Gere Engineers Inc.,
- Consultant, Long-term meteorological data analysis for the Green Bay. Limno-tech Inc.
- Consultant, Temperature and currents analyses for the Cleveland harbor. Limno-tech Inc.,
- Consultant, 30-year Lake Ontario thermal and current structure. Environment Canada
- Consultant, Columbus Engineering Consultants, Hydrological and hydraulic analyses for City of Columbus storm water Capital Improvement Projects (CIP)

INVITED SPEECH

- Swiss Federal Institute of Technology (EPFL), Switzerland, 2018
- National Taiwan University (NTU), National Kaohsiung Marine University, Taiwan, 2017
- University of Notre Dame, Indiana, 2017
- Tulane University, New Orleans, 2014
- National Central University, and Tamkang University, Taiwan 2012
- University of Tokyo, Japan, 2012
- Korean Ocean Research and Development Institute (KORDI), Korea, 2010, 2005
- National Kaohsiung Marine University and Taiwan Normal University, Taiwan 2009

SUPERVISING/MENTORING

- Visiting professor and dissertation committee, Swiss Federal Institute of Technology (EPFL)
- Adjunct Faculty, Dissertation Committee, School of Earth Sciences, The Ohio State University

- Dissertation committee, Department of Civil Engineering, Michigan Technological University
- Thesis committee, Department of Earth and Environmental Sciences, Tulane University
- Dissertation committee, Marine-Estuarine Environmental Sciences, University of Maryland
- Mentor, NOAA/GLERL/CIGLR postdoc and graduate fellowship program
- Mentor, NOAA/GLERL/CIGLR Summer fellowship program
- Supervisor, Navy Research Enterprise Internship Program (NREIP) summer students
- Mentor, NRL Science and Engineering Apprentice Program (SEAP) summer students
- Mentor, MentorNet in Engineering and Science

JOURNAL REVIEW/CONFERENCE SERVICE

- Reviewer, NOAA JTTI, Marine Debris, RESTORE ACT, and SBIR programs
- Reviewer, Journal of Ocean Dynamics
- Reviewer, International Journal of Marine Geodesy
- Reviewer, Journal of Great Lakes Research
- Reviewer, Lake Erie at the Millennium bi-national conference proceedings
- Reviewer, International Conference on Estuarine and Coastal Modeling
- Reviewer, Marine and Coastal Geographical Information System (M&CGIS)
- Reviewer, Bulletin of American Meteorological Society (BAMS)
- Chair, Session on Model Coupling and Data Assimilation, IAGLR
- Co-Chair, Session of Satellite Remote Sensing, Int. Conference on Great Lakes Research
- Session Chair, International Workshop on Modeling the Ocean (IWMO)

PUBLICATIONS

28. Xinyu Ye, **Philip Y. Chu**, Eric J. Anderson, Chenfu Huang, Gregory A. Lang, Pengfei Xue, Improve Thermal Structure Prediction and Optimize Data Sampling Strategy of Lake Erie Using a Data Assimilative Model (Under Revision)
27. Anderson, E.J.; Fujisaki-Manome, A.; Kessler, J.; Lang, G.A.; **Chu, P.Y.**; Kelley, J.G.; Chen, Y.; Wang, J. 2018. Ice Forecasting in the Next-Generation Great Lakes Operational Forecast System (GLOFS). *J. Mar. Sci. Eng.* 2018, 6, 123. (doi: 10.3390/jmse6040123) <http://www.mdpi.com/2077-1312/6/4/123/pdf>
26. Ye, X., E. J. Anderson, **P. Y. Chu**, C. Huang, & P. Xue, 2018. Impact of water mixing and ice formation on the warming of Lake Superior: a model-guided mechanism study. *Limnology and Oceanography*, (doi: 10.1002/lno.11059)
25. Kolker, A.S., A.M. Dausman, M.A. Allison, G.L. Brown, **P. Chu**, K. de Mutsert, C.E. Fitzpatrick, J.R. Henkel, D. Justic, B.A. Kleiss, E. McCoy, E. Meselhe, and C.P. Richards, 2018. Rethinking the Rliver. *EOS, Earth & Space News* (DOI:10.1029/2018EO101169) <https://eos.org/features/rethinking-the-river>
24. Linares, A., C.H. Wu, E.J. ANDERSON, and **P.Y. Chu**, 2018. Role of Meteorologically Induced Water Level Oscillations on Bottom Shear Stress in Freshwater Estuaries in the Great Lakes. *Journal of Geophysical Research: Oceans* 123(7):4970-4987, DOI:10.1029/2017JC013741

23. Niu, Q., M. Xia, S.A. Ludson, **P.Y. Chu**, D.M. Mason and E.S. Rutherford, 2018. High-turbidity events in Western Lake Erie during ice-free cycles: Contribution of river-loaded vs. resuspended sediment. *Limnology and Oceanography* (DOI:10.1002/lno.10959)
22. Pullen, J., R. Allard, H. Seo, A.J. Miller, S. Chen, P. Pezzi, T. Smith, **P. Chu**, J. Alves, and R. Caldeira, 2018. Coupled ocean-atmosphere forecasting at short and medium time scales In *The Science of Ocean Prediction, The Sea*. P. Lermusiaux and K. Brink N. Pinardi.
21. Wang, J., J. Kessler, X. Bai, A.H. Clites, B.M. Lofgren, A. Assuncao, J.F. Bratton, **P. Chu**, and G.A. Leshkevich. Decadal variability of Great Lakes ice cover in response to AMO and PDO, 1963-2017. 2018. *Journal of Climate* 31(18):7249-7268 (DOI:10.1175/JCLI-D-17-0283.1)
20. Xue, P., J. Pal, X. Ye, J. Lenters, C. Huang and **P.Y. Chu**, 2017. "Improving the Simulation of Large Lakes in Regional Climate Modeling: Two-way Lake-atmosphere Coupling with a 3-D Hydrodynamic Model of the Great Lakes", *J. Climate* (Doi:10.1175/JCLI-D-16-0225.1)
19. Xiao, C., B. M. Lofgren, J. Wang, and **P. Y. Chu**, 2016 "Improving the lake scheme within a coupled WRF-Lake model in the Great Lakes", *J. Adv. Model. Earth Syst.*(Doi: 10.1002/2016MS00717)
18. Allard, R.A, E.R. Rogers, P. J. Martin, T.G. Jensen, **P.Y. Chu**, T. Campbell, J. Dykes, T.A. Smith, 2014. "The US Navy Coupled Ocean –Wave Prediction System", *Journal of Oceanography*, p92-103.
17. **Chu, P.**, G. A. Jacobs, M.K. Cambazoglu and R.S. Linzell, 2012. "Multi Model Validation of Currents in the Chesapeake Bay Region in June 2010", *J. Marine Geodesy*, 35:399-428.
16. **Chu, P.** and J. Kelley, G. Mott, A.J. Zhang and G. Lang, 2011. "Development, Implementation and Skill Assessment of the NOAA/NOS Great Lakes Forecast System", *J. of Ocean Dynamics*, Vol61, No9, p1305-1316.
15. **Chu, P.**, Blain C.A. and Linzell, R.S., 2010. Development and Implementation of an Operational Coastal Forecast System, Proceeding of Korea-China Joint Workshop on Marine Environment Forecasting System for the Yellow Sea and East China Sea, Jeju, Korea, p13-16.
14. **Chu.Y.P.**, C.A. Blain and R.S. Linzell, 2009. Development of a Relocatable Operational Coastal Modeling System for the US Navy, Oceans 09 MTS/IEEE, MS.
13. **Chu, P.**, C.A. Blain, 2009. Development of a Relocatable Coastal Forecast System – Korean Coast Application, 2009 International Workshop on Operational System for Marine Environment and Forecasting, Kaohsiung, Taiwan, p123-130.
12. **Chu, P.** J. Kelley, A.J. Zhang, G. Lang and K. Bedford, 2007. "Skill Assessment of NOS Great Lakes Forecast System", 10 th International Conference on Estuarine and Coastal Modeling.
11. Schwab, D., G. Lang, K. Bedford and **P. Chu**, 2001. "Great Lakes Coastal Forecasting System" American Meteorological Society conference on Coastal and Atmospheric Predictions.
10. **Chu,Y.P.** and K.W. Bedford, 2000. "Development of Lake Michigan Nowcast/Forecast Modeling System and the Prospects for a Sediment Transport Prediction Model", 6th International Conference on Estuarine and Coastal Modeling, New Orleans, LA.
9. Schwab, D., G. Lang, K. Bedford and **Y.P.Chu**, 2000. "Recent Development in the Great Lakes Forecasting System(GLFS)", Third Conference on Coastal Atmospheric and Ocean Prediction and Processes, New Orleans, LA, pp201-206.
8. **Chu, Y.P.** and K.W. Bedford, "Impact of Satellite Derived Cloud Data on Model Predictions of Surface Heat Flux and Temperature: A Lake Erie Example", Proceedings of the International Conference on Estuarine and Coastal Modeling, Alexandria, VA, pp556-569, 1998.

7. **Chu, Y.P.**, 1998. "The Incorporation of Hourly GOES Data in a Surface Heat Flux Model and Its Impacts on Operational Temperature Predictions in Bodies of Water", Ph.D. dissertation, The Ohio State University, Columbus, OH, 273p.
6. **Chu, Y.P.** and K.W. Bedford, 1995. GLFSView3.0 User's Guide, Ohio Sea Grant Program, 12p.
5. **Chu, Y.P.**, Bedford. K.W. and Marble. D.F., 1995. "Technical Issues Surrounding the Integration of GIS with 3-D Numerical Models of Spatial Processes", Ninth Annual Symposium on Geographic Information Systems, Vancouver, BC, pp274-381.
4. **Chu, Y.P.**, C.C.J. Yen and K.W. Bedford, 1994. "GLFSVIEW- GLFS Product Viewing Application". National Conference on Hydraulic Engineering, ASCE, Buffalo, NY, pp207-211.
3. **Chu, Y.P.**, K.W. Bedford, C.J. Merry and J.S. Hobgood, 1994. "Impact of GOES Data on Surface Heat Flux Predictions". National Conference on Hydraulic Engineering, ASCE, Buffalo.
2. **Chu, Y.P.** and K.W. Bedford, 1994. GLFSView2.0 User's Guide, Ohio Sea Grant Program, 12p.
1. **Chu, Y.P.** and K.W. Bedford, 1993, GLFSView1.0 User's Guide, Ohio Sea Grant Program, 12p.

BOOK CHAPTERS

- Pullen, J., R. Allard, H. Seo, A.J. Miller, S. Chen, P. Pezzi, T. Smith, **P. Chu**, J. Alves, and R. Caldeira, 2018. Coupled ocean-atmosphere forecasting at short and medium time scales In *The Science of Ocean Prediction, The Sea*. P. Lermusiaux and K. Brink N. Pinardi.
- Chu, Y.P.**, Bedford. K.W. and Marble. D.F., 1995. "Technical Issues Surrounding the Integration of GIS with 3-D Numerical Models of Spatial Processes", Ninth Annual Symposium on Geographic Information Systems, Vancouver, BC, pp274-381.

TECHNICAL REPORTS

14. Zhang, H., J. Wang, T.-y. Yang, B.M. Lofgren, and **P. Chu**. 2018. Statistical relationships between biological parameters and environmental forcings in Lake Erie, 1970s–2010s. NOAA Technical Memorandum GLERL-173. NOAA, Great Lakes Environmental Research Laboratory, 69 pp. (DOI:10.25923/6jgm-1x64). https://www.glerl.noaa.gov/pubs/tech_reports/glerl-173/tm-173.pdf
13. Wang, J., J. Kessler, F. Hang, H. Hu, A.H. Clites, and **P. Chu**, 2017. Analysis of Great Lakes Ice Cover Climatology: Winters 2012-2017. NOAA Technical Memorandum GLERL-171. NOAA, Great Lakes Environmental Research Laboratory, 25 pp. https://www.glerl.noaa.gov/pubs/tech_reports/glerl-171/tm-171.pdf
12. Wang, J., J. Kessler, F. Hang, H. Hu, A.H. Clites, and **P. Chu**, 2017. Great Lakes Ice Climatology Update of Winters 2012-2017: Seasonal Cycle, Interannual Variability, Decadal Variability, and Trend for the period 1973-2017. NOAA Technical Memorandum GLERL-170. NOAA, Great Lakes Environmental Research Laboratory. https://www.glerl.noaa.gov/pubs/tech_reports/glerl-170/tm-170.pdf
11. Allard, Campbell, Smith, **Chu**, Dykes, Veeramony and Rogers, 2014. "Coupled Ocean-Wave-Air Prediction System". FY13 NRL DoD High Performance Computing Modernization Program Annual Reports, p70-71.
10. Allard, R.A., T.J. Campbell, T.A. Smith, T.G. Jensen, **P. Chu**, E.W. Rogers, U.M. Gravois and S.N. Carroll, 2012. Validation Test Report for the Coupled Ocean Atmosphere Mesoscale Prediction System (COAMPS) Version 5.0 Ocean/Wave, NRL/MR/7322-11-2012, 110pp.

9. Smith S., J. Cummings, C. Rowley, **P. Chu**, J. Shriver, R. Helber, P. Spence, S. Carroll and O.M. Smedstad, 2012. Validation Test Report for the Navy Coupled Ocean Data Assimilation 3D Variational Analysis (NCODA-VAR) System Version 3.43, NRL/MR/7320-12-9363, 148pp.
8. **Chu, P.**, G.A. Jacobs, K.M. Cambazoglu and R.S. Linzell, 2012. Multi-Model Validation in the Chesapeake Bay Region in June 2010, NRL Report MR/7320-12-9297, 40pp.
7. Allard, R.A., T.J. Campbell, T.A. Smith, T.G. Jensen, **P. Chu** and J. Dykes, 2012. Coupled Ocean-Air Prediction System, DoD High Performance Computing Modernization Program Annual Report, p68-69.
6. Blain, C.A., R.S. Linzell, **P. Chu** and C. Massey, 2010. "Validation Test Report for the ADvanced CIRCulation Model (ADCIRC)V45.11, NRL Technical Report", NRL/MR/7320-10-9205, 109pp.
5. Kelley, J., A.J. Zhang, **P. Chu** and G. Lang, 2010. "Skill Assessment of NOS Lake Huron Operational Forecast System (LHOFS)", NOAA Technical Report NOS CS23, 53pp.
4. Kelley, J., A.J. Zhang, **P. Chu** and G. Lang, 2008. "Skill Assessment of NOS Lake Ontario Operational Forecast System (LOOFS)", NOAA Technical Report NOS CS13, 40pp.
3. **Chu, P.** J. Kelley, A.J. Zhang, G. Lang and K. Bedford, 2007. "Skill Assessment of NOS Lake Erie Operational Forecast System (LEOFS)", NOAA Technical Report NOS CS12, 73p.
2. Kelley, John, **P. Chu**, A.J. Zhang, G. Lang and D. Schwab, 2007. "Skill Assessment of NOS Lake Michigan Operational Forecast System (LMOFS)", NOAA Technical Report NOS CS8, 67p.
1. Kelley, J., **P. Chu**, 2007. "Skill Assessment of NOS Lake Superior Operational Forecast System (LSOFS)", NOAA Technical Report NOS CS9, 48p.